

What Is Claimed Is:

1 1. An apparatus that translates host names into Internet Protocol (IP)
2 addresses, comprising:
3 a plurality of name servers, wherein each name server is configured to
4 translate a host name into a corresponding IP address; and
5 a plurality of load balancers coupled to the plurality of name servers,
6 wherein each load balancer is configured to,
7 receive requests for host name translations, and to
8 distribute the requests between the plurality of name servers
9 so as to balance load across the plurality of name servers;
10 wherein the plurality of load balancers are configured to operate in parallel
11 in distributing requests between the plurality of name servers.

1 2. The apparatus of claim 1, wherein each of the plurality of load
2 balancers is associated with its own IP address, and is configured to process
3 translation requests directed its own IP address.

1 3. The apparatus of claim 1, wherein each of the plurality of load
2 balancers is configured to take over load balancing operations for one or more
3 failed load balancers in the plurality of load balancers.

1 4. The apparatus of claim 3,
2 wherein load balancers in the plurality of load balancers are organized into
3 a ring; and

4 wherein each load balancer is configured to take over load balancing
5 operations for a neighboring load balancer in the ring, if the neighboring load
6 balancer fails.

1 5. The apparatus of claim 1, wherein each load balancer in the
2 plurality of load balancers is a proxy server that is configured to accept user
3 datagram protocol (UDP) and transmission control protocol (TCP) connections
4 from domain name system (DNS) clients, and to forward corresponding UDP or
5 proxy TCP requests to the plurality of name servers.

1 6. The apparatus of claim 1, wherein each of the plurality of load
2 balancers is configured to distribute translation requests between the plurality of
3 name servers based upon measured response times of the plurality of name
4 servers.

1 7. The apparatus of claim 1, further comprising an internal
2 communication network that couples the plurality of load balancers with the
3 plurality of name servers.

1 8. A method for translating a host name into an Internet Protocol (IP)
2 address, comprising:
3 receiving a translation request to translate the host name into the IP
4 address;
5 selecting a name server from a plurality of name servers to process the
6 translation request based upon a measured load of the plurality of name servers, so
7 that overloaded name servers will not be selected; and

8 forwarding the translation request to the selected name server so that the
9 selected name server can translate the host name into the IP address.

1 9. The method of claim 8, wherein receiving the translation request
2 involves receiving the translation request at one of a plurality of load balancers,
3 wherein each load balancer is configured to:
4 receive translation requests for host name translations; and to
5 distribute the translation requests between the plurality of name servers so
6 as to balance load across the plurality of name servers.

1 10. The method of claim 9, wherein each of the plurality of load
2 balancers is associated with its own IP address, and is configured to process
3 translation requests directed its own IP address.

1 11. The method of claim 9, further comprising taking over load
2 balancing operations, if necessary, for one or more failed load balancers in the
3 plurality of load balancers.

1 12. The method of claim 11, wherein the plurality of load balancers are
2 organized into a ring; and
3 wherein each load balancer is configured to take over load balancing
4 operations for a neighboring load balancer in the ring.

1 13. The method of claim 9, wherein each load balancer in the plurality
2 of load balancers is a proxy server that is configured to accept user datagram
3 protocol (UDP) and transmission control protocol (TCP) connections from

4 domain name system (DNS) clients, and to forward corresponding UDP or proxy
5 TCP requests to the plurality of name servers.

1 14. The method of claim 8, further comprising measuring a load on the
2 plurality of name servers by periodically:

3 sending an information request to each name server in the plurality of
4 name servers; and

5 measuring a response time to the information request for each name server
6 in the plurality of name servers.

1 15. A method for performing failovers between a plurality of load
2 balancers that are configured to balance requests for host name to IP address
3 translations between a plurality of name servers that are coupled to the plurality of
4 load balancers, comprising:

5 sending a keep alive packet to a first neighboring load balancer in the
6 plurality of load balancers;

7 waiting for a response to the keep alive packet in order to determine if the
8 first neighboring load balancer remains alive;

9 if the first neighboring load balancer does not remain alive, taking over
10 servicing of translation requests directed to the first neighboring load balancer.

1 16. The method of claim 15, further comprising:

2 receiving a second keep alive packet from a second neighboring load
3 balancer in the plurality of load balancers; and

4 sending a response to the second keep alive packet to the second
5 neighboring load balancer.

1 17. The method of claim 15, wherein each of the plurality of load
2 balancers is associated with its own IP address, and is configured to process
3 translation requests directed its own IP address.

1 18. The method of claim 15, wherein the plurality of load balancers are
2 organized into a ring; and
3 wherein each load balancer in the plurality of load balancers is configured
4 to take over load balancing operations for a neighboring load balancer in the ring.

1 19. The method of claim 15, wherein each load balancer in the
2 plurality of load balancers is a proxy server that is configured to accept user
3 datagram protocol (UDP) and transmission control protocol (TCP) connections
4 from domain name system (DNS) clients, and to forward corresponding UDP or
5 proxy TCP requests to the plurality of name servers.

1 20. The method of claim 15, further comprising distributing translation
2 requests between the plurality of name servers based upon measured response
3 times of the plurality of name servers.

1 21. An apparatus that translates host names into Internet Protocol (IP)
2 addresses, comprising:
3 a plurality of name servers, wherein each name server is configured to
4 translate a host name into a corresponding IP address; and
5 a plurality of load balancers coupled to the plurality of name servers,
6 wherein each load balancer is configured to,
7 receive requests for host name translations, and to

8 distribute the requests between the plurality of name servers
9 so as to balance load across the plurality of name servers;
10 wherein the plurality of load balancers are configured to operate in parallel
11 in distributing requests between the plurality of name servers;
12 wherein each of the plurality of load balancers is configured to take over
13 load balancing operations for one or more failed load balancers in the plurality of
14 load balancers; and
15 wherein each of the plurality of load balancers is configured to distribute
16 translation requests between the plurality of name servers based upon measured
17 response times of the plurality of name servers.

1 22. A method for translating a host name into an Internet Protocol (IP)
2 address, comprising:
3 receiving a translation request at one of a plurality of load balancers to
4 translate the host name into the IP address;
5 selecting a name server from a plurality of name servers to process the
6 translation request based upon a measured load of the plurality of name servers, so
7 that overloaded name servers will not be selected;
8 forwarding the translation request to the selected name server so that the
9 selected name server can translate the host name into the IP address; and
10 taking over load balancing operations, if necessary, for one or more failed
11 load balancers in the plurality of load balancers;
12 wherein each load balancer is configured to distribute the translation
13 requests between the plurality of name servers so as to balance load across the
14 plurality of name servers.

1 23. A method for performing failovers between a plurality of load
2 balancers that are configured to balance requests for host name to IP address
3 translations between a plurality of name servers that are coupled to the plurality of
4 load balancers, comprising:
5 distributing translation requests between the plurality of name servers
6 based upon measured response times of the plurality of name servers;
7 sending a keep alive packet to a first neighboring load balancer in the
8 plurality of load balancers;
9 waiting for a response to the keep alive packet in order to determine if the
10 first neighboring load balancer remains alive;
11 if the first neighboring load balancer does not remain alive, taking over
12 servicing of translation requests directed to the first neighboring load balancer;
13 receiving a second keep alive packet from a second neighboring load
14 balancer in the plurality of load balancers; and
15 sending a response to the second keep alive packet to the second
16 neighboring load balancer.